NEW WESTERN TRICHOPTERA

D. G. DENNING
Walnut Creek, California

Collections of caddisflies examined recently have disclosed several undescribed forms which show some interesting modifications and relationships to presently known species. As is often characteristic of the western montane fauna several of the new species belong to closely related species complexes. The Trichoptera described herein are from Washington, California, Idaho and Alberta. I am deeply indebted to Dr. C. P. Alexander of the University of Massachusetts, Mr. Borys Malkin, University of Washington, and Mr. D. L. Abell for sending me material used in this paper. Unless indicated otherwise types of the new species are in the writer's collection.

Agapetus cornuta Denning, new species

This, the twenty-fifth Nearctic species described in the genus can easily be distinguished from other species by the large acute horn-like processes of the tenth tergite. Approximately half of the known species occur in the western montane region.

Male.—Length 5 mm. General color of body, legs and antennae dark brown, wings fulvous. Fifth sternite with the usual concentric organ; mesal process of sixth sternite peg-like and directed caudad. *Genitalia* as in fig. 1. Ninth segment annular, ventral portion about twice width of the narrowed dorsal part. Tenth tergite consists of a pair of divergent heavily sclerotized plates, connected basally by a membranous sheath, fig. 1B; each lateral lobe narrow, the dorsal margin curved sharply near apex as a prominent acuminate prong, apex broadly triangular and directed caudad, best seen from lateral aspect, fig. 1A. Cerci from dorsal view, fig. 1B, narrowed apically, arising from ventral portion of tenth tergite and about half its length; from lateral aspect dorsal and ventral margins parallel, apex truncate. Clasper broadened distally, dorso-distal corner sub-triangular, about midway the length of dorsal margin a small slender spine arises from mesal surface and projects mesad; ventro-distal corner obtuse, when viewed from ventral aspect mesal margin of apex dentate, tip dark brown in color.

Holotype male, KLICKITET CREEK, NEAR GOLDENDALE, WASHINGTON, Aug. 28, 1952, D. G. Denning.

Wormaldia lacerna Denning, new species

This, the twelfth Nearctic species, is a member of the Moesta Group, which contains the following three Nearctic species: *gabriella, moesta* and *lacerna. Gabriella,* fig. 4, which possesses a long wide tongue-like mesal process on the seventh abdominal sternite

and one of variable lengths on the eighth, fig. 4B, is a western species known to extend eastward at least to Churchill, Manitoba, and Western South Dakota; for comparison to *lacerna* the male genitalia are figured. The new species, *lacerna,* possesses a short mesal process on the seventh and none on the eighth sternite and is at present known only from the northwestern United States. The third Nearctic species, *moesta,* is known only from eastern Canada and the United States and possesses a long slender mesal process on both the seventh and eighth sternites.

Male.—Length 7 to 8 mm. General color of head, thorax and wings fulvous, legs, spurs and antennae flavescent. Forewings with R_2 absent, as in *gabriella.* Mesal process of seventh sternite slender and short, extending beyond margin no longer than half the width of the sternum, fig. 2C, eighth sternum with scarcely any indication of a mesal process. *Genitalia* as in fig 2. Ninth segment annular, considerably narrowed dorsally, ventral portion produced caudad almost as far as apex of tenth tergite. Cerci digitate, slender throughout, apex subacute, fig. 2A. Tenth tergite typical for genus, undivided, carcinate and tapering to an acute apex extending caudad practically as far as apex of cerci, fig. 2B. Basal segment of clasper longer than wide, in the shape of a parallelogram; apical segment constricted near base, expanded distally with apical margin circular and directed caudo-dorsad. In this latter respect it bears some similarity to *gabriella* Banks.

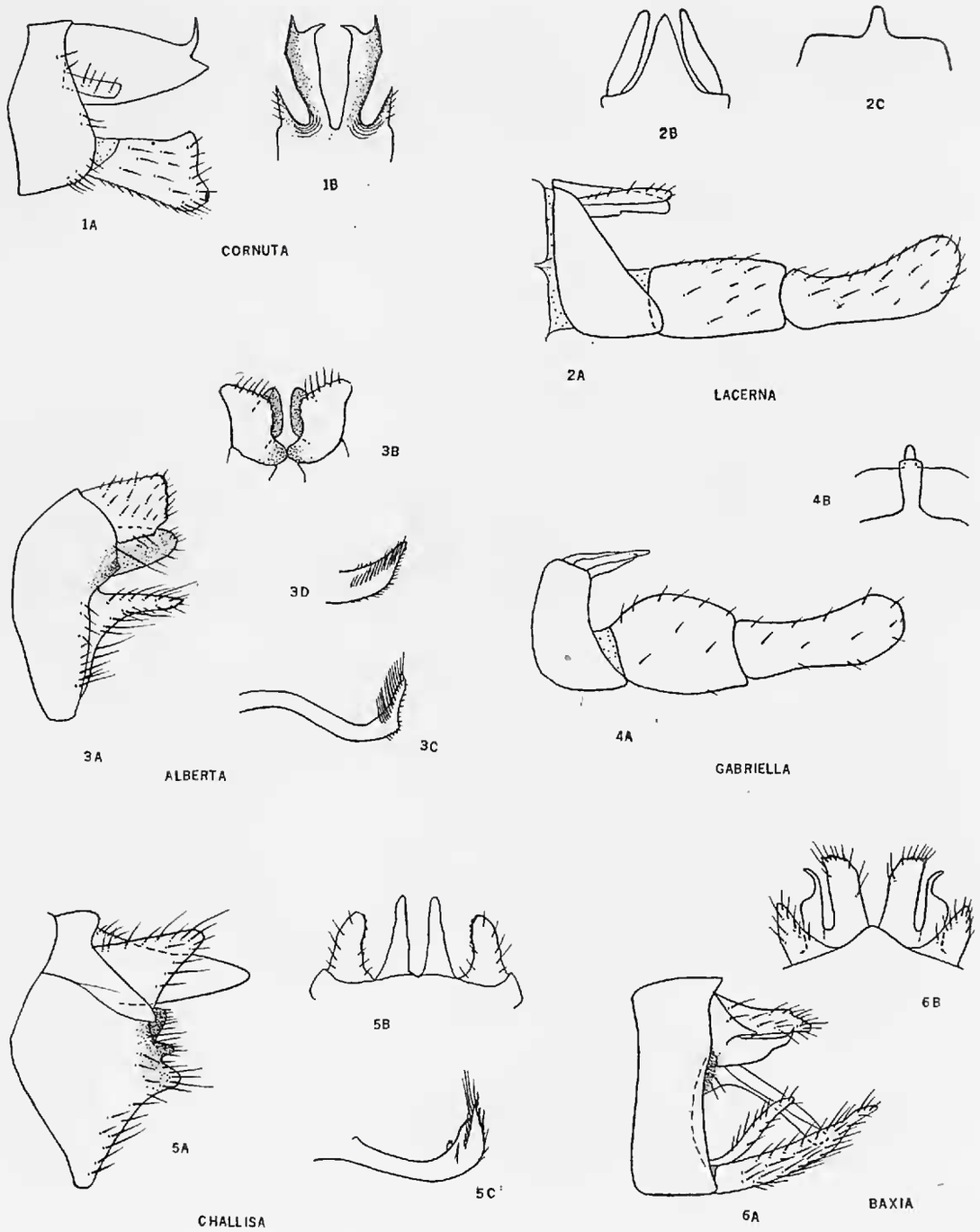
Holotype male, SATUS CREEK, NEAR GOLDENDALE, WASHINGTON, Oct. 2, 1952, D. G. Denning. *Paratypes,* two males, same data as for holotype.

WORMALDIA OCCIDEA (Ross)

1938. *Wormaldia cruzensis* (Ling). Pan-Pacific Ent., 14:64, *New Synonymy.*

In the Collection of the California Academy of Sciences a collection of Wormaldia containing four males and two females, apparently collected in the same series as the holotype *cruzensis* from Felton, Santa Cruz County, California, was recently examined. These specimens were found to be identical to the type *cruzensis* which is in the Collection of the California Academy of Sciences, San Francisco. A study of *cruzensis* indicates that it is a synonym of *occidea* Ross.

In Ross' study of the Philopotamidae in his monumental "Evolution and Classification of the Mountain Caddisflies" the *Wormaldia* are divided into various Groups. The Anilla Group contains this and a half dozen additional Nearctic species. *Wormaldia anilla* and *occidea* are very closely related and in some specimens separation is difficult largely because the mesal process



Explanation of Figures

Fig. 1. *Agapetus cornuta*, male genitalia; 1A, lateral aspect; 1B, tenth tergite and cerci, dorsal aspect. Fig. 2. *Wormaldia lacerna*, male genitalia; 2A, lateral aspect; 2B, tenth tergite, dorsal aspect; 2C, eighth sternum. Fig. 3. *Limnephilus alberta*, male genitalia; 3A, lateral aspect; 3B, cerci and tenth tergite, dorsal aspect; 3C, lateral arm of aedeagus; 3D, lateral arm of aedeagus, apex, mesal surface. Fig. 4. *Wormaldia gabriella*, male genitalia; 4A, lateral aspect; 4B, seventh and eighth sternum. Fig. 5. *Limnephilus challisa*, male genitalia; 5A, lateral aspect; 5B, cerci and tenth tergite, dorsal aspect; 5C, lateral arm of aedeagus. Fig. 6. *Lepidostoma baxea*, male genitalia; 6A, lateral aspect; 6B, tenth tergite and cerci, dorsal aspect.

of the seventh sternum is variable in size. In the "*cruzensis*" specimens from Santa Cruz County, California, the mesal process of the seventh sternum is considerably shorter than found in specimens from other western localities which have been examined by the writer.

Limnephilus alberta Denning, new species

This species can be distinguished from others in the genus by the short massive cerci, reduced plate-like tenth tergite lobes, and the slender apically acute lateral arm of the aedeagus.

Male.—Length 16 mm. Head and thorax dark brown, antennae, legs and palpi yellowish, spurs 2–3–4. Wings dark brown with darker mottling along veins, irrorate with clear markings. Front basitarsus distinctly longer than second segment. Eighth tergite with no mesal lobe or patch of black setae. *Genitalia* as in fig. 3. Ninth segment slender, narrowed ventrally, and reduced to a narrow bridge dorsally. Clasper projecting caudad just beyond any other portion of segment, dorsal margin straight, ventral margin evenly arcuate and forming a sub-acute apex. Cerci short and massive, directed dorso-caudad; distal margin from dorsal view, fig. 3B, widely rounded and dentate; ventral margin, lateral aspect fig. 3A, considerably shortened; from caudal aspect distal surface black, circular, concave and heavily sclerotized. Tenth tergite reduced, divided into two widely separated lateral lobes; when viewed dorsally, fig. 3B, platelike, lateral surface convex; from lateral aspect 3A, apex widely ovate, black, heavily sclerotized and setation sparse. Entire lateral arms of aedeagus sclerotized, sharply angulate distally, fig. 3C; mesal surface of apex bearing a row of fulvous, flattened dense setae reaching dorsad beyond apex of structure, fig. 3D.

Holotype male, PIPESTONE RIVER, NEAR LAKE LOUISE, ALBERTA, Aug. 22, 1954, D. G. Denning. *Paratype* male, 12 miles west of Banff, Alberta, July 23, 1949, C. P. Alexander.

Limnephilus challisa Denning, new species

This species is a member of the *cockerelli-harrimani* Banks section and is apparently closest to *lopho Ross*. It may easily be distinguished from that species and others, by the cerci being considerably shorter than the tenth tergite and the small appressed padlike ventral lobe of the tenth tergite.

Male.—Length 14 mm. Head, thorax and femora dark brown, remainder of legs, spurs, antennae and palpi fulvous, wings light brown, lightly irrorate with dark brown. Front basitarsus about one and one-half times length of second segment. Eighth tergite simple, mesal patch of black setae absent. *Genitalia* as in fig. 5. Ninth segment considerably narrowed dorsally and ventrally, sternum about one-third width of dorsum. Claspers consist of a short plate with distal margin incised to form a short triangular dorsal lobe and a large obtuse ventral lobe, bearing scattered short setae, fig. 5A. Cerci projected posteriad about two-thirds distance of tenth tergite; from

lateral aspect cercus is triangular; from dorsal aspect, fig. 5B, it is short, stocky, and digitate, thickened at base and gradually tapering to a rounded apex, mesal surface very heavily sclerotized and minutely dentate. Tenth tergite divided into two distinct lobes, long, narrowed and acuminate from dorsal aspect, fig. 5B; from lateral aspect dorsal margin oblique, ventral margin straight, apex subacute; ventral lobe padlike, closely appressed to sclerite and bearing dense black setae. Aedeagus with lateral arm completely sclerotized, fig. 5C, apex curved abruptly dorsad and bearing a brush of dense, long stout setae.

Holotype male, HYNDMAN CREEK, CHALLIS, BLAINE COUNTY, IDAHO, July 22, 1952, Borys Malkin. *Paratypes,* four males. Same data as for holotype.

Lepidostoma baxea Denning, new species

This is the second described species in the Cantha Group, and it can be differentiated from *cantha* Ross by the totally different baso-ventral sclerotized spur of the tenth tergite. In *cantha* these structures curve mesad and then laterad, in *baxea* they project directly caudad and only the extreme apical portion is curved laterad.

Male.—Length 8 mm. Thorax, head, legs and antennae ferruginous, wings gray with irregular scattering of black scales. Costal vein slightly reflexed most of length of costal cell, densely lined with black scales. First antennal segment without any modifications; maxillary palpi erect, the apparent single segment bearing a dense brush of long black scales. All spurs normal except inner spur of fore legs which is enlarged and covered with small black scales. In *cantha* and members of the Pluviale Group to which *baxea* and *cantha* are closely related, the legs and spurs are not modified. *Genitalia* as in fig. 6. Ninth segment annular, practically same width throughout, dorso-mesal margin projecting slightly caudad. Tenth tergite divided into two lateral lobes, consisting of an elongated tapering mesal lobe held roof-like and a caudad directed ventro-lateral spur, the distal portion slender, acute and curved laterad, best seen from dorsal aspect, fig. 6B. Claspers long, slender and tapering toward a truncate apex, heavily clothed with long hair; baso-dorsal lobe short, slender and digitate, fig. 6A. Aedeagus arcuate and bearing a pair of stout acuminate rods along contour of structure.

Holotype male, DRY CREEK, FRESNO COUNTY, CALIFORNIA, May 1, 1954, D. I. Abell, deposited in collections of California Academy of Sciences.

While most streams are of considerable interest because of the many ecological differences they exhibit from source to mouth, this stream as a productive source of such insects as Trichoptera, is unusual because of its intermittent flow, being dry in summer and fall. Dry Creek has been classified by Usinger (1956:15) in

Aquatic Insects of California, as a long-flow fluctuating intermittent stream. In the Central Valley Foothill region of California such long-flow intermittent streams are common; it is not known how productive of Trichoptera others of these kind of streams may be.

References

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A NEW SPECIES OF STETHORUS WEISE FROM GUATEMALA NOW BEING RELEASED IN CALIFORNIA

(Coleoptera: Coccinellidae)

J. C. Hall and C. A. Fleschner

University of California, Riverside

In the winter of 1955, the junior author sent to the University of California at Riverside, Citrus Experiment Station, Department of Biological Control, a large number of live specimens of an undescribed species of *Stethorus* Weise found preying on avocado brown mites, *Oligonychus punicae* (Hirst), on avocado trees in Guatemala. This *Stethorus* was introduced into the United States in an attempt to establish it as a predator of Tetranychid mites.

Approximately 40,000 beetles have been released in citrus and avocado groves in seven California counties. In addition, 1,350 beetles have been sent to the Fruit Insects Laboratory of the United States Department of Agriculture at Orlando, Florida, for release there, and 300 beetles have been sent to the Texas Agricultural Experiment Station at Weslaco, Texas. At present it is not certain whether this *Stethorus* will become established in California.

The following description is given at this time in order to make the name available for future publications and also to aid in its identification.

Stethorus guatemalensis Hall and Fleschner, new species

In coloration *S. guatemalensis* is similar to *S. punctum* (Le Conte); the genitalia is very much like *S. picipes* Casey. *S. guatemalensis* may be distinguished from *S. punctum* by the sub-